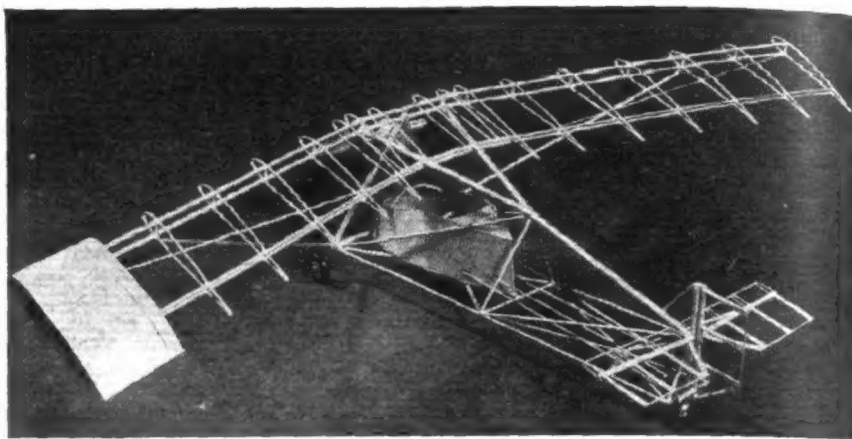


THE £100 AEROPLANE

Mr. Pemberton Billing's Return to Aviation : A Machine with Welded Bicycle-tube Construction : Fittings Suppressed Altogether : Typical "P. B." Unorthodoxy



A scale model of the Pemberton Billing Skylark's "skeleton." All joints are welded. (Flight photograph.)

QUITE early in British aviation history, somewhere about 1912 or 1913, there lived on board a three-masted schooner moored in the River Itchen a man who had been badly bitten by the "aviation bug." At Woolston, in a very modest works, a few other enthusiasts were hard at it trying to translate into actuality the ideas which came to our friend on the schooner during the long watches of the night. In time, a flying boat with frames of circular section and a built-on step began to take shape. A rotary engine (Gnome) was fitted in the gap, its axis tilted to direct the slipstream on to the tail-plane, so that when the high centre of thrust should disappear with the stopping of the engine, the disappearance of the slipstream should reduce the download on the tail, thus evening matters up again.

The man who visualised all these features was the founder of the Supermarine Aviation Works, and his name was destined to become associated with many phases of early British aviation. Noel Pemberton Billing was the man, and among those who were associated with him from the start was Mr. Hubert Scott-Paine, who was later to become Mr. Pemberton Billing's successor and to whom fell the task of consolidating, with Commander James Bird, the foundations on which later Supermarine greatness was built.

Some Early "P. B." Efforts

It is, perhaps, significant that the flying boat referred to was known as the P.B.3. Two designs had preceded it, but had not been built. This one did not fly, but that was an incidental fact shared by not a few early aircraft. The right ideas were there, but not, so to speak, in the correct proportions. Facts and figures for correlating the ideas were still to be dug out laboriously, and engines of 100 horse-power were something of a rarity.

Before he abandoned aviation to go into politics "P. B." had many more brainwaves. There was, for example, the height indicator for use when alighting in the dark, a weight suspended below the flying boat and warning the pilot, as it struck the water, that it was time to flatten out. There was the design, much ahead of its time, of a flying boat in which, if engine failure caused a descent on the sea, the wings were allowed to float away and the hull proceed as a motor boat, unhampered by a superstructure. There was what *Flight* of those days called the "Seven-day 'Bus," a little biplane said to have been designed, built and flown within a week. There was the quaint little pusher machine which became known as the "Push-Prodge," and there was an equally unorthodox quadruplane, a military type with gun turrets and other things which would seem quite modern to-day.

"P. B." was ever unorthodox and was always doing the unexpected. When, therefore, he rang up *Flight* a few days ago and asked if we were interested in an aeroplane that could be sold for £100, or for £125 including tuition, we were slightly sceptical, but not surprised. It was so exactly like "P. B." to spring one like that on us. Within the hour he had turned up at *Flight's* offices, had explained his new aeroplane, had shown us just about the neatest all-purpose camera in the world (produced from a watch pocket), had had the model of his aeroplane photographed, and had left us dazed and somewhat wondering.

"P. B." is no believer in the *Pou-du-Ciel*, but he is a

believer in the small, cheap aeroplane. He is about to demonstrate his belief by marketing one. The Pemberton Billing Skylark, as was to be expected, is not quite like any other aeroplane ever built, although it has most of the orthodox features, wings, a tail, an undercarriage, a cockpit, and an engine. But these ingredients are mixed in an unusual way, and held together without fittings, and almost without bolts. One expects "P. B." to have an amusing time with the Air Ministry airworthiness people in connection with his plain welded joints without reinforcing of any sort.

Welded tubular wing spars to which are welded the tubular steel ribs form the basis of the wing. The rest is a plain covering of sheet aluminium, simply screwed to spars and ribs. The back-swept wing is strut braced to the front spar only, the sheet metal covering being relied upon, in conjunction with the welded joints of the ribs, to transmit loads from rear to front spar. There are no ailerons. "P. B." admits that he may have to add them afterwards. At present he does not wish to, as they mean weight and cost. The elevators are intended to take over the usual aileron duties, being independently hinged and so geared to the controls by pull-and-push rods that one can be made to move up when the other moves down. In addition they retain their natural elevator movement. "P. B." points out that, after all, the *Pou-du-Ciel* flies without ailerons, so he ought to be a little better off.

To transmit torque of this nature from the tail to the wings will demand a very rigid tail girder. The triangulated welded structure of the model was found to be amazingly stiff in torsion, so that possibly the full-size machine may be satisfactory in this respect.

The Undercarriage

The undercarriage is of the simplest imaginable type: Each wheel is carried on a stub axle, and as the telescopic strut is a part of the main aircraft structure, there is no difficulty in providing a very long stroke, two feet, if it is thought necessary for really clumsy landings. The wheels seem too far forward to get the tail up during take-off.

It could scarcely be claimed that the Skylark is a pretty aeroplane, but as "P. B." points out, it is designed for cheap flying and not for high performance. Fairing and streamlining has had to go by the board.

A Douglas engine is foreseen for the experimental machine, but afterwards there may be a "P. B." aero engine specially produced for the Skylark.

Bicycle tubing is the material which has been selected for the construction of the Skylark. All the tubing used in the machine will weigh about 140lb.; engine, tanks and petrol, another 140lb.; the nacelle about 25lb.; wing and tail covering, undercarriage and controls another 125lb. With a pilot of 170lb. the loaded weight of the Skylark is estimated at 600lb. or so. The wing area is 112 sq. ft., and the wings are bolted to the centre-section by 8 bolts. For hangarage, or for towing behind a car, they are stacked along each side of the tail girder, when the overall width is about 6ft. When spread, the wings have a span of 29ft.

One gathers that a company is to be formed for the production of the Skylark in quantities. A good deal of thorough testing of the first machine will be needed before the many unorthodox features can be considered welded (literally) into a trustworthy whole.